Track: DaVinci Data Exchange for Quality Measures (DEQM)

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Introduction to DEQM

For this InterOpathon, Quality Reporting Scenarios from the DaVinci Data Exchange for Quality Measures Implementation Guide (DEQM) have been implemented in the Interoperability Institute's Interoperability Land (IOL).

The DEQM FHIR Implementation Guide (IG) describes the value of the DEQM IG as:

"Interoperability challenges have limited many stakeholders in the healthcare community from achieving better care at lower cost. The dual challenges of data standardization and easy information access are compromising the ability of both payers and providers to create efficient care delivery solutions and effective care management models. To promote interoperability across value-based care stakeholders and to guide the development and deployment of interoperable solutions on a national scale, the industry needs common information models and data exchange standards. The intent of the framework defined in this guide is to enable automatic data collection and submission limiting the need for manual processing and intervention. Ultimately, a national standard based on FHIR for data structure and exchange will reduce the burden on clinicians of transforming data between systems." (http://hl7.org/fhir/us/davinci-deqm/2020Feb/#reporting-scenarios)

Quality Reporting includes the following scenarios:

- Exchange using collect-data, submit-data and Data Exchange MeasureReport
- Reporting using an Individual MeasureReport

Exchange Scenario

Exchange scenarios are used to exchange subsets of the data-of-interest for a measure or set of measures throughout the measurement period. These scenarios enable providers and quality stakeholders such as payers, accountable care organizations, and other secondary use partners to keep better track of how patients are performing with respect to a particular quality measure during the measurement cycle.

Out of the three types of exchange scenarios offered by DEQM the Submit Data scenario was implemented for the May InterOpathon.

- Submit Data - Used by a producing system to submit a subset of the data-of-interest for a measure to a consuming system

Additional scenarios may be available in subsequent InterOpathon events.

Reporting Scenario

Reporting scenarios are used to report the results of quality measures on patients or populations at the end of a measurement period. Measure reports are provided to attest the standard of care given to patients in a population as measured by specific quality measures. The measures are typically identified as part of a quality improvement program or initiative by a payer or other quality improvement

stakeholder such as Public Health with use cases that are typically more focused on the reporting scenarios.

Out of the three types of reporting scenarios offered by DEQM the Individual scenario was implemented for the May InterOpathon.

- Individual - Used to report the results of a quality measure for a particular patient along with the complete set of data-of-interest to a quality reporting receiver

Additional scenarios may be available in subsequent InterOpathon events.

InterOpathon Participation Guide

Overview

The Exchange – Submit Data and Reporting – Individual scenarios have been implemented as REST endpoints on the Blaze Global Health Provider, MiHIN, and Better Health Payer PITs. Participation in the InterOpathon consists of posting messages to the Blaze Global Health Provider to run the Exchange and Reporting scenarios and then evaluate the outcomes.

Participation will include two phases, Measurement Period Simulation and the Challenge.

As part of the Measurement Period Simulation, the participant will use Postman and the Postman Collection that has been supplied to simulate DEQM during a Measurement Period. Participants will use the Requests in the *IOL Connectathon DEQM Participation* Postman Collection to Create a Patient, Submit Partial Measure Requirements, and then Submit Full Measure Requirements. Data Exchange and Individual Reporting will be performed at key points during the simulation to illustrate results. The details of these steps are described in the Measurement Period Simulation section.

In the Challenge, the participant will create an application that displays the results of the DEQM operations throughout the Measurement Period.

Technical Background

Exchange Scenario

Exchange scenarios are used to exchange subsets of the data-of-interest for a measure or set of measures throughout the measurement period. These scenarios enable providers and quality stakeholders such as payers, accountable care organizations, and other secondary use partners to keep better track of how patients are performing with respect to a particular quality measure during the measurement cycle.

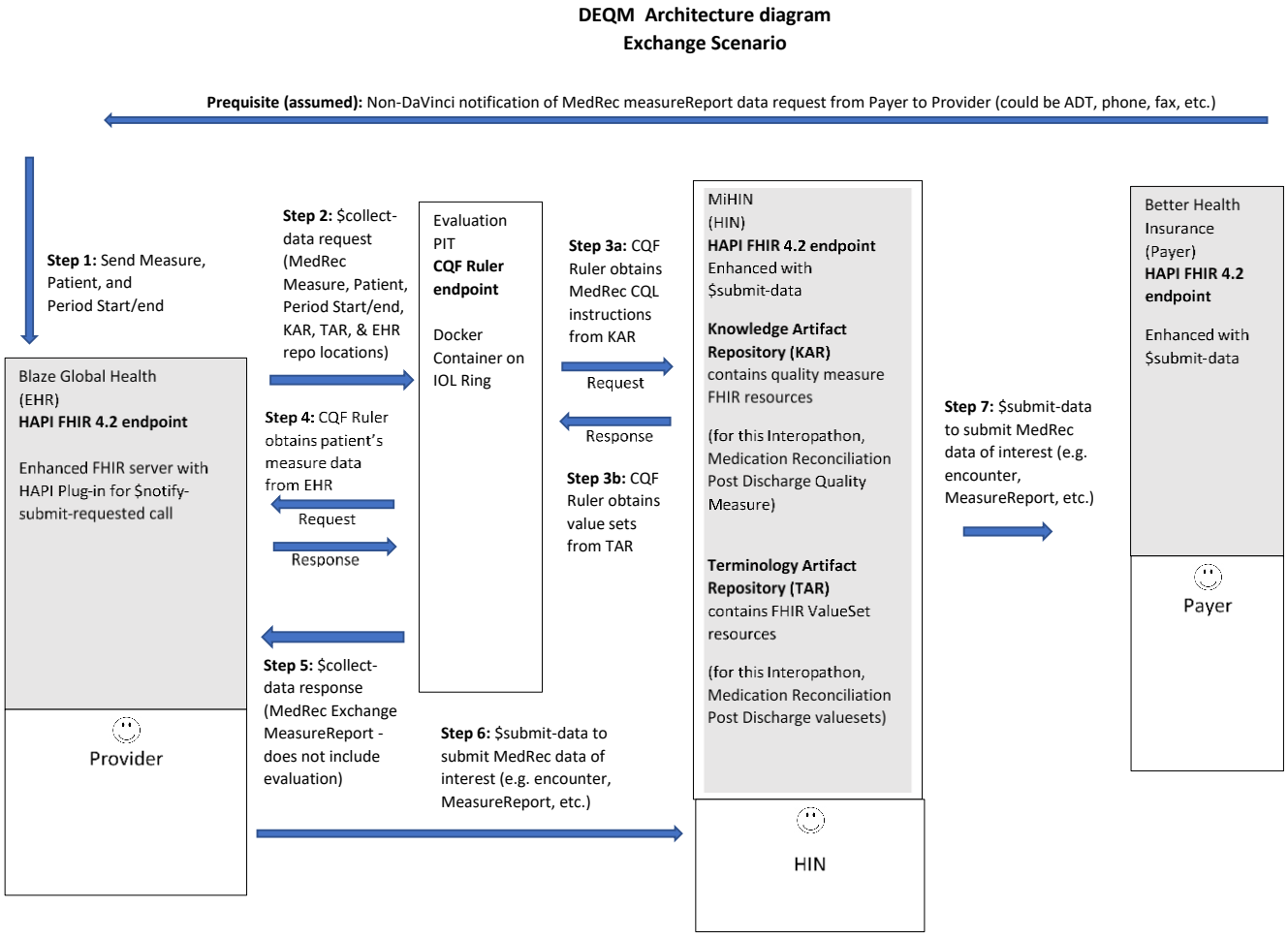
The steps to trigger and execute the data-exchange are as follows:

- The Participant triggers data-exchange on the Provider PIT via the $notify-submit-requested operation. $notify-submit-requested represents a process or activity that triggered the

Exchange Scenario at the Provider. This could take many forms in the real-world, including ADT, phone, fax, EHR trigger, etc.

- The Provider PIT triggers data collection on the Evaluation PIT via $collect-data
- The Evaluation PIT queries the Knowledge Artifact PIT for the Measure-related resources
- The Evaluation PIT uses the Terminology PIT to expand the related ValueSets
- The Evaluation PIT queries the Provider PIT for the data-of-interest
- The Provider PIT submits the data-of-interest to the HIN PIT via $submit-data
    - Technical note: The standard method of submitting in the Exchange Scenario is a direct call from the Producer to the Consumer, however, this has been modified for the IOL so the Producer does not require direct knowledge of the Consumer and this aspect can be managed by the HIN.

The HIN PIT submits the data-of-interest to the Payer PIT via $submit-data



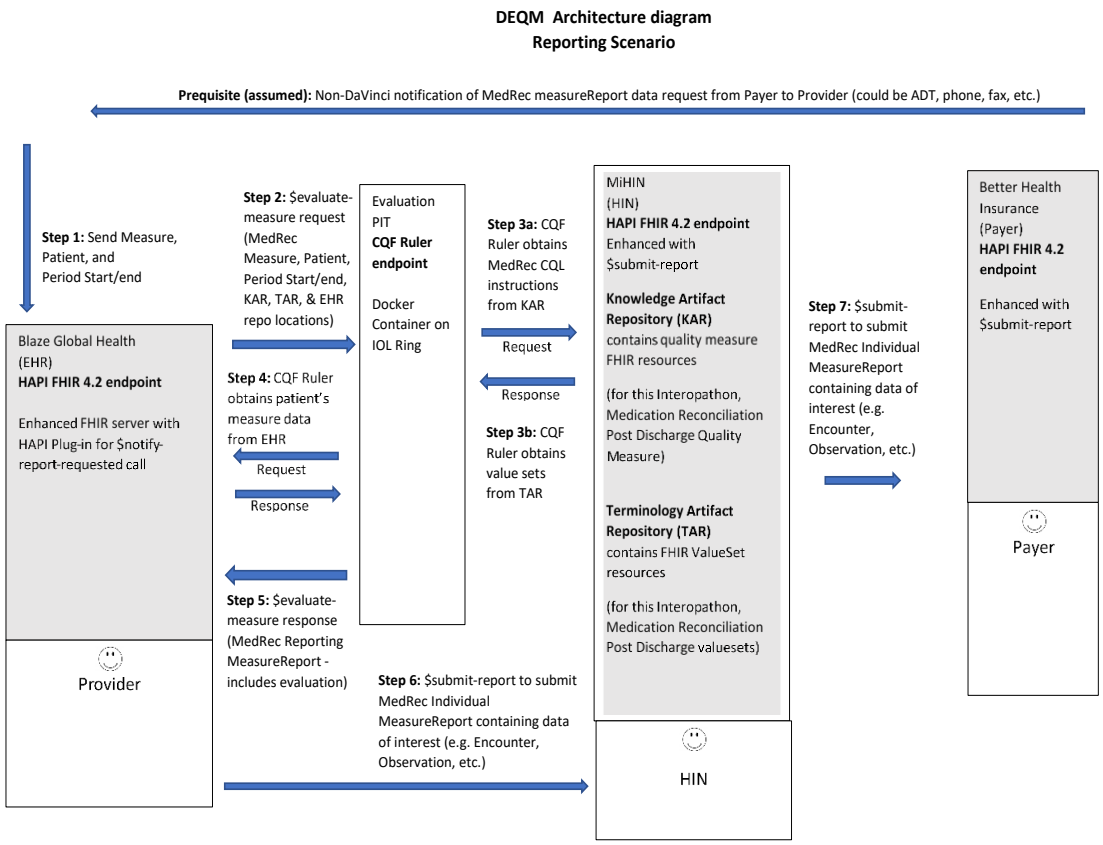
Reporting Scenario

Reporting scenarios are used to report the results of quality measures on patients or populations at the end of a measurement period. Measure reports are provided to attest the standard of care given to patients in a population as measured by specific quality measures. The measures are typically identified

as part of a quality improvement program or initiative by a payer or other quality improvement stakeholder such as Public Health with use cases that are typically more focused on the reporting scenarios.

The steps to trigger and execute the reporting scenario are as follows:

- The Participant triggers reporting on the Provider PIT via the $notify-report-requested operation. $notify-report-requested represents a process or activity that triggered the Reporting Scenario at the Provider. This could take many forms in the real-world, including ADT, phone, fax, EHR trigger, etc.
- The Provider PIT triggers measure evaluation on the Evaluation PIT via $evaluate-measure
- The Evaluation PIT queries the Knowledge Artifact PIT for the Measure-related resources
- The Evaluation PIT uses the Terminology PIT to expand the related ValueSets
- The Evaluation PIT queries the Provider PIT for the data-of-interest
- The Evaluation PIT evaluates the Quality Measure and produces a Measure Report
- The Provider PIT submits the Measure Report to the HIN PIT via $submit-report
    - Technical note: The standard method of submitting the Measure Report is a simple POST to the directly to the Consumer, however, this has been modified for the IOL so the Producer does not require direct knowledge of the Consumer and this aspect can be managed by the HIN.
- The HIN PIT submits the Measure Report to the Payer PIT via $submit-report



Disclaimer

Implementation of the following Data Element of the DEQM Individual MeasureReport Profile is outside of scope:

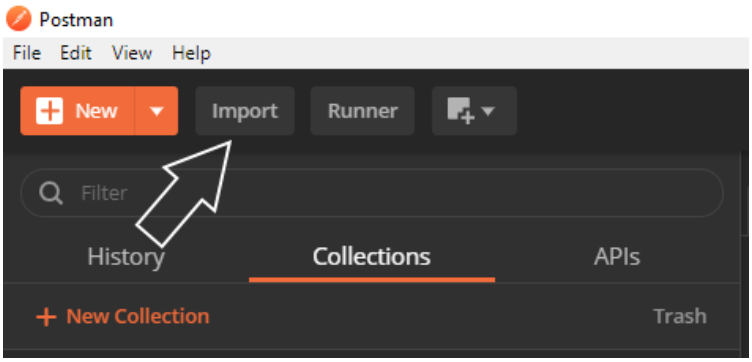
- Ability to use other types for measure score using the DEQM Alternate Score Type Extension

In order to facilitate the exercise, the Individual MeasureReport id has been "pinned" to a hard-coded value. This would not be the case in a real-world scenario. This behavior may change in a future InterOpathon.

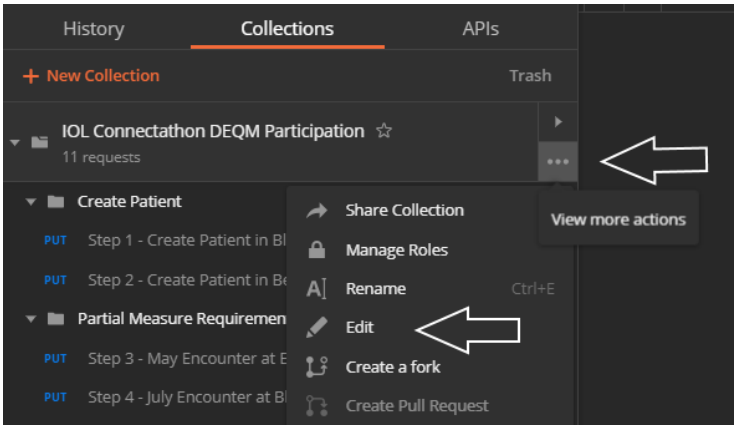
Per the DEQM specification, each Reporting operation should produce additional resources in the Consumer, but the CQF Ruler Measure Evaluation Reference Implementation being used includes the resources in a contained element within the MeasureReport. Posting them to the Consumer from the contained element is outside of scope. This would not be the case in a real-world scenario with a production-grade Measure Evaluation service. This behavior may change in a future InterOpathon.

Postman Setup

1. Download and install Postman: https://www.postman.com/downloads/
2. Import the Postman Collection file you were provided (IOL Connectathon DEQM Participation.postman_collection.json)

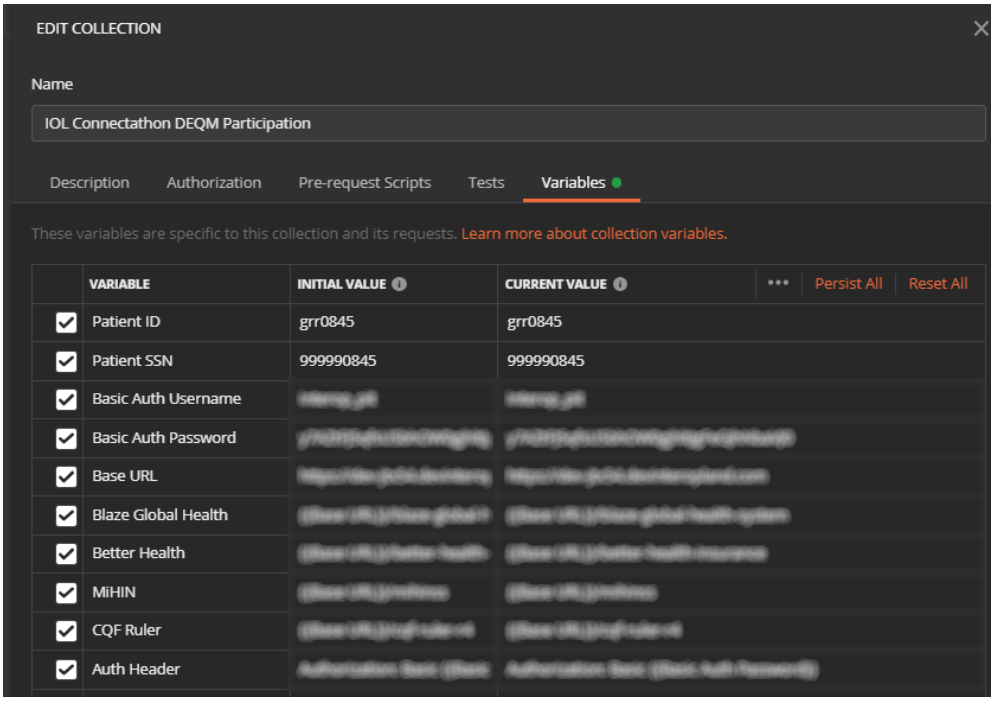


3. Set the Patient ID and Patient SSN variables
    a. Open the Edit Collection form. Click the ellipse to the right of the collection title, then click Edit



b. To generate a Patient ID, combine your initials and the current time, using two digits each for the hour and minutes
    i. Example: grr0845
c. To generate a Patient SSN, combine 99999 (five 9s) and the current time, using two digits each for the hour and minutes (for a total of nine digits)
    i. Example: 999990845

4. Switch to the Variables tab, then type the Patient ID and Patient SSN values into both the INITIAL VALUE and CURRENT VALUE columns and then Update. **Do not use the values in the example above. Generate your own values per the instructions and enter those.**



See Appendix: Updating Postman Admin Variables if the Basic Auth Username, Basic Auth Password, or Base URL are not set, or if you need to modify them. Note, the instructions in the

appendix are primarily for missing values. Changes to existing values should be made with care and only by experienced users.

Measurement Period Simulation

Overview

During the Measurement Period Simulation phase, you will run through steps to simulate the DEQM activity related to a specific patient throughout the course of a measurement year. The Blaze Global Health PIT will play the role of Producer in DEQM and the Better Health Insurance PIT will play the role of Consumer.

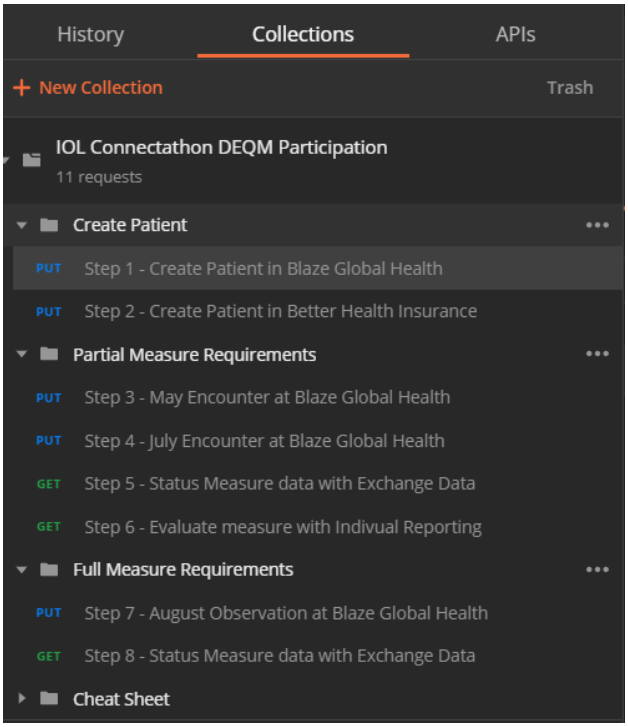
The Measurement Period Simulation exercise has three activities: Create Patient, Partial Measure Requirements, and Full Measure Requirements. The activities contain a total of eight steps.

The simulation will utilize the HEDIS MRP (Medication Reconciliation Postdischarge) Quality Measure. The MRP Quality Measure is met for patients with an Inpatient Encounter, no readmission within thirty days of that Inpatient Encounter, and with a Medication Reconciliation within 30 days of the Inpatient Encounter.

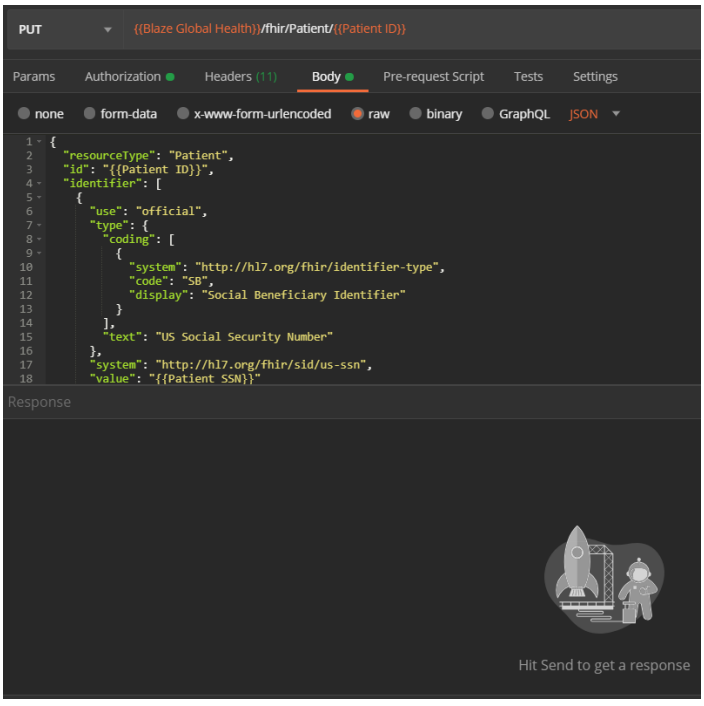
During the simulation you will first submit two Inpatient Encounters that will qualify the patient for the Initial Population and Denominator criteria. You will then submit a Medication Reconciliation Observation that will qualify the patient for the Numerator criteria. The measureScore is then calculated by dividing the Numerator by the Denominator. The Denominator Exclusion criteria is not used in this exercise. Disclaimer: the MRP Quality Measure used for the scenario is a Work in Progress, not a finalized, certified Quality Measure. Additionally, the patient resources are not actual patient data. As such the results produced may not be clinically accurate. A real-world scenario would use a production ready, certified Quality Measure and actual clinical data.

Activities

Each of the Activities corresponds to a folder in your Postman Collection. Each Step corresponds to a Request within that folder.



For each Step, click the step in the Collection and then click in the Body tab to view the Request and Response. Note, you should not edit the content of the Request as the simulation relies on specific values.



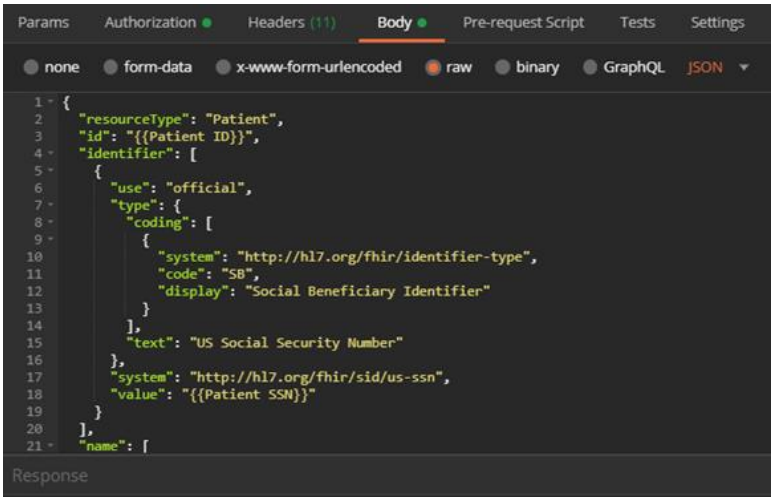
Follow the Steps below to run the Measurement Period Simulation. Click Send to execute each step. A Response similar to the Example Response indicates the data was successfully submitted to the PIT.

Note: Requests are in green text and Responses are in orange text. Do not edit green text (you can't edit the orange text, it's read-only).

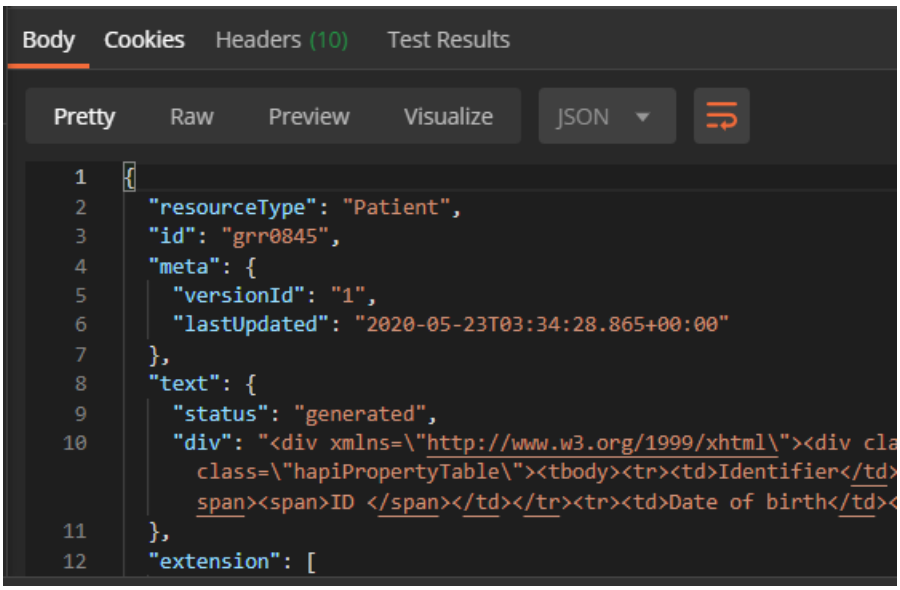
Create Patient

- Step 1 - Create Patient in Blaze Global Health: this step will create a new Patient in the Blaze Global Health PIT.
    - To run the step, select the corresponding entry in the collection directory (to the far left) and click Send (to the far right). Do not edit the contents of the Request, just click Send.

Example content of the Request (DO NOT EDIT):

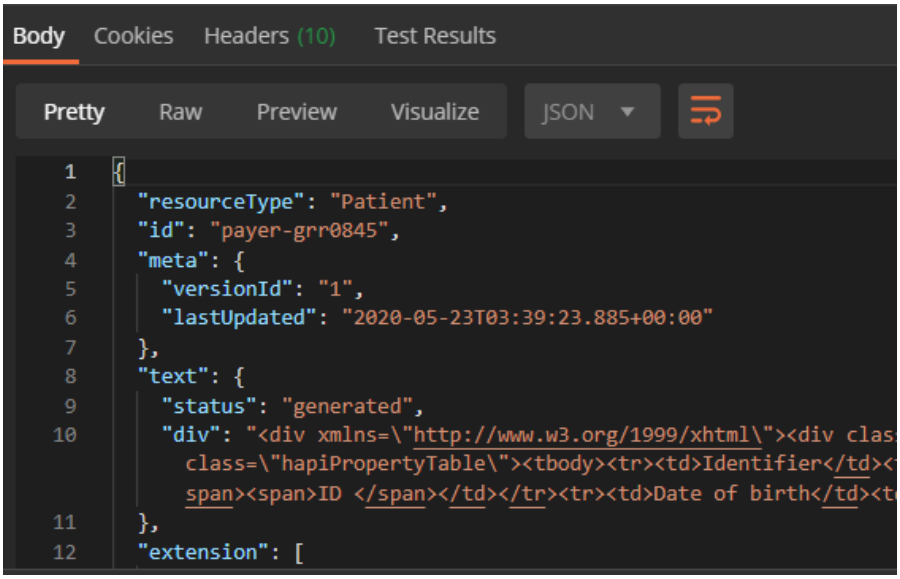


- Your response should look like the following (the Response pane is below the Request pane. It will be empty initially, but will populate when the Send completes):



- Step 2 - Create Patient in Better Health Insurance: this step will create a new Patient in the in the Better Health Insurance PIT. Note, the same Patient will have different IDs in different PITs, but they will share the same SSN.
    - Select the step in the collection directory and click Send

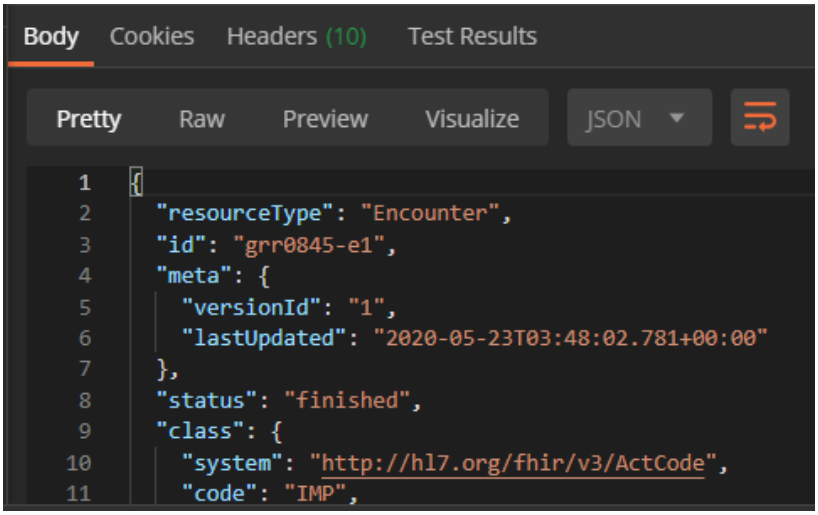
    Example Response:



Partial Measure Requirements

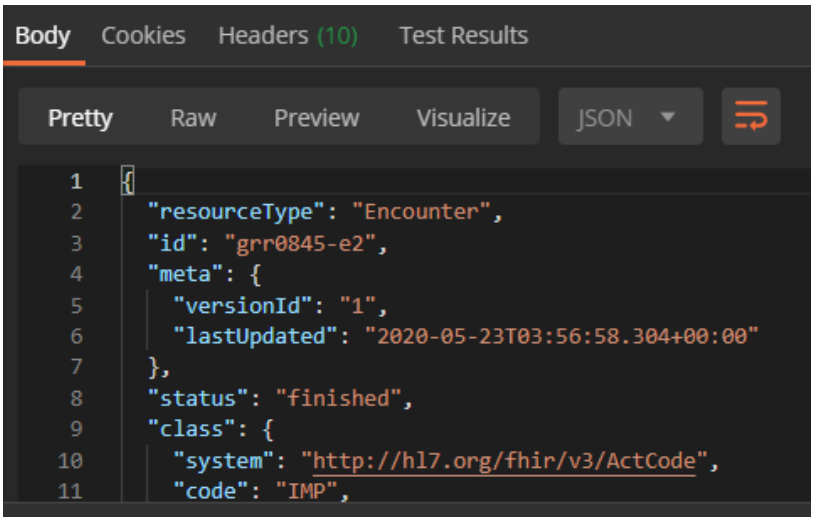
- Step 3 - May Encounter at Blaze Global Health: this step simulates the patient attending an Inpatient Encounter in May.
    - Select the step in the collection directory and click Send

    Example Response:



- Step 4 - July Encounter at Blaze Global Health: this step simulates the patient attending a second Inpatient Encounter in June. The patient now qualifies for the Initial Population of the Quality Measure.
    - Select the step in the collection directory and click Send

Example Response:

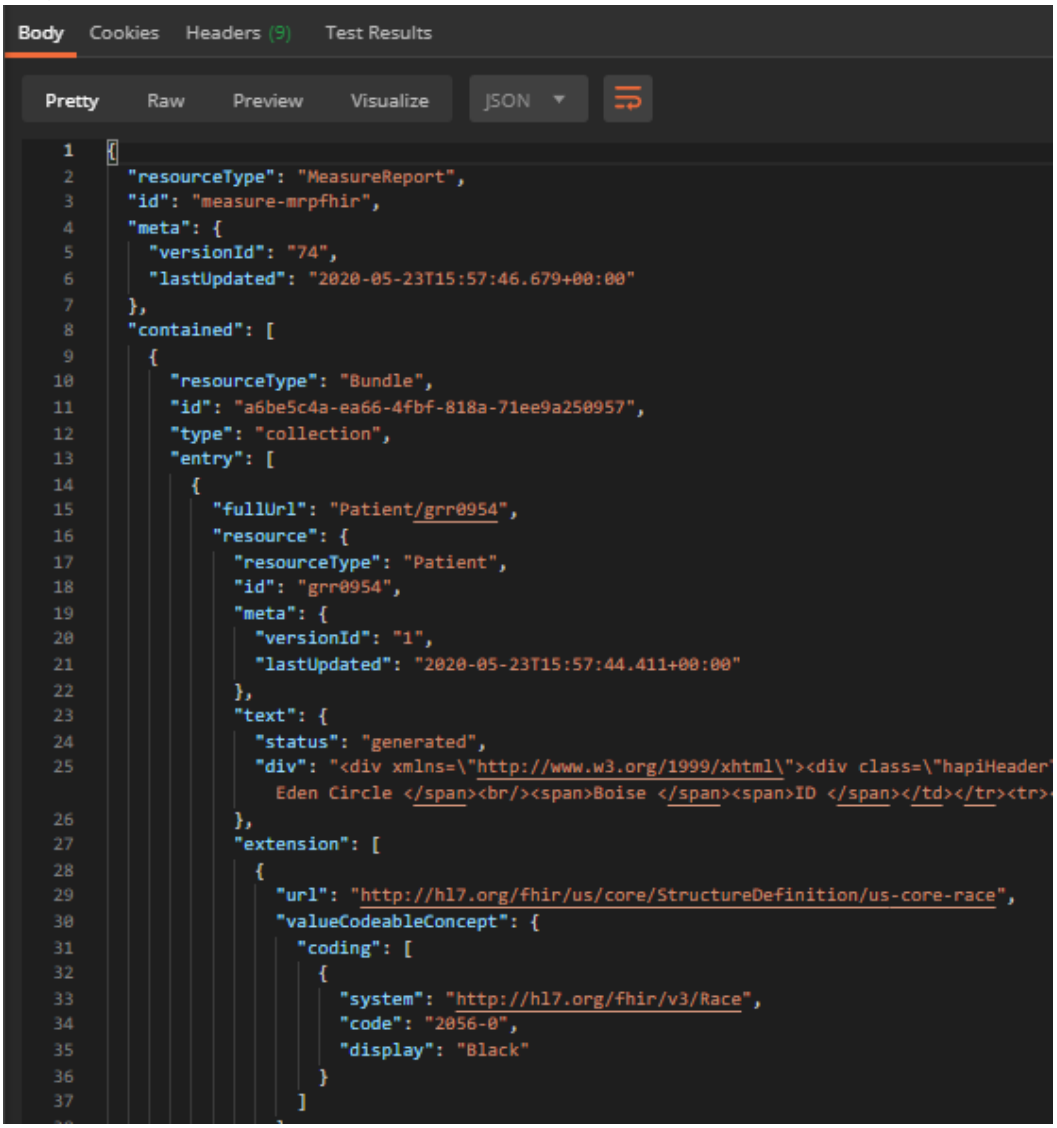


- Step 5 - Status Measure data with Data Exchange: this is the first DEQM step. The $notify-submit-requested operation is invoked to simulate a process or activity that triggered the Exchange Scenario at the Provider. The existing data related to the Quality Measure, for the patient, is then collected via $collect-data. This data is then shipped to the Payer via $submit-data. The end result is that the Data of Interest, along with a DEQM Data Exchange Measure Report (which has not been evaluated and, therefore, does not include a Score), is posted to the Better Health Insurance PIT as a collection of related data. The collection of data includes the source Organization, the Patient, the two Encounters, and a MeasureReport. However, in IOL different PITs have different IDs, including the Patient in this Collection of data. You cannot query the newly added data by the Patient ID. You must link the new data to the pre-existing patient in the Better Health Insurance PIT by the SSN Identifier. Note the Data of Interest that meets the Initial Population criteria in the Example Response (two Encounters, zero Observations).
    - Select the step in the collection directory and click Send

Example Response:

- Step 6 - Evaluate measure with Individual Reporting: this is the second DEQM step. The $notify-report-requested operation is invoked to simulate a process or activity that triggered the Reporting Scenario at the Provider. The Individual Measure Report is the result of Measure Evaluation and includes a Score. The patient meets the Initial Population criteria, but, as the patient has not received a qualifying Observation, the Numerator criteria is not met and the Score is 0.0. Note that the standard response for the DEQM Reporting scenario lists the posted data, as in the prior step. That behavior has been modified for the exercise to facilitate viewing the results. Instead of returning the data that was created, the operation returns the evaluated Measure Report. Scroll to the bottom of the Response and note the Denominator count is 2, but the measureScore is 0.0, as the Numerator count is 0.
    - Select the step in the collection directory and click Send

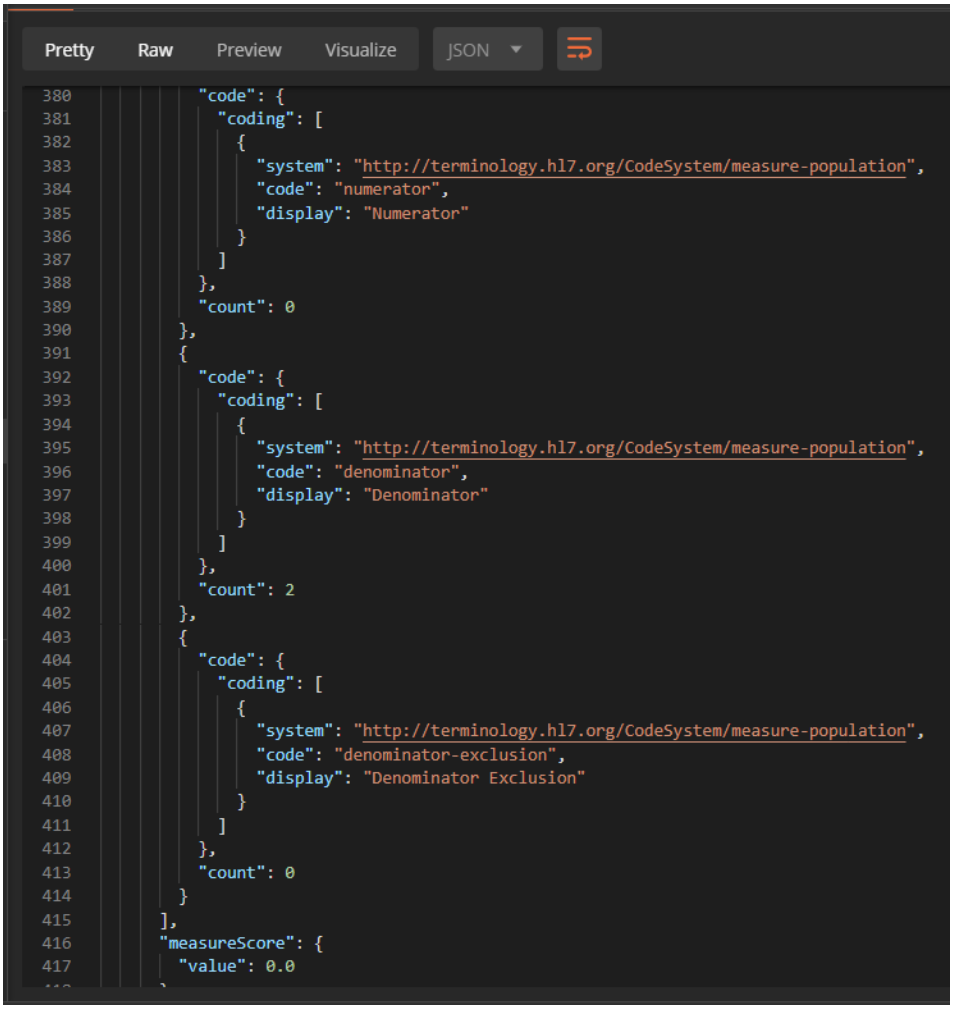
Example Response (the full response is too large to fit, but the first page should be similar to this):



- Scroll to the bottom and note the Initial Population, Numerator, Denominator, and measureScore.

  The expected Results are:

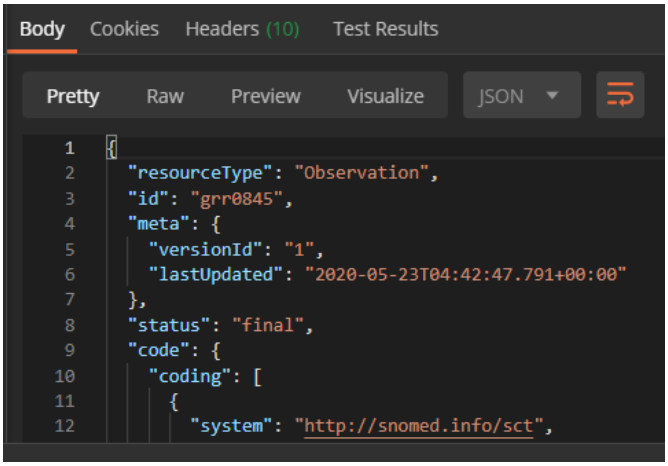
  - Initial Population: count = 2
  - Numerator: count = 0
  - Denominator: count = 2
  - Denominator Exclusion: count = 0
  - measureScore: value 0.0



Full Measure Requirements

- Step 7 - August Observation at Blaze Global Health: this step simulates the patient receiving a Medication Reconciliation Observation in August. The patient now qualifies for the Numerator of the Quality Measure.
    - Select the step in the collection directory and click Send

    Example Response:



- Step 8 - Status Measure data with Data Exchange: this is the third and final DEQM step in the simulation. The $notify-submit-requested operation is invoked to simulate a subsequent initiation of the Exchange Scenario at the Provider, perhaps triggered by the meeting of the Numerator criteria, for example. Again, the existing data related to the Quality Measure is collected via $collect-data and then shipped to the Payer via $submit-data. The end result is that a new collection of the Data of Interest is posted to the Better Health Insurance. This collection includes everything in the prior collection plus the new Observation, i.e., the source Organization, the Patient, the two Encounters, a MeasureReport, an Observation, and the associated Practitioner. Note the Data of Interest that meets the Numerator criteria in the Example Response (two Encounters, one Observation).
    - Select the step in the collection directory and click Send

Example Response:

- Notice the additional Observation and Practitioner resources

Note: it can take a little while for the Observation to fully process and become available for query. This can cause the Observation to not show in the Response. If the Observation is not included in the Response, please just continue on. It has been successfully posted to the Better Health Insurance PIT and will show in the "Evaluate measure with Individual Reporting" query of the Challenge. Alternatively, you can re-run this step until it is in the Response. Just keep in mind that every time you run this Step it will deliver an additional collection of Data of Interest to the Better Health Insurance PIT, which will correspondingly increase the total number of resources in the Challenge.

This concludes the Measurement Period Simulation phase.

At this point you might be wondering why we didn't run the $notify-report-requested operation again so we could see the newly available measureScore results… on to the Challenge!

The Challenge

Now that you have constructed a simulation of the DEQM activity related to a specific patient throughout the course of a measurement year, the Challenge is to create an application that visualizes the results in the Better Health Insurance PIT.

At the beginning of the simulation, the data in the Better Health Insurance PIT related to your patient included a single Patient resource. Through the simulation process you added two collections of related data with the following resources:

1. Patient, Organization, MeasureReport, Encounter 1, Encounter 2
2. Patient, Organization, MeasureReport, Encounter 1, Encounter 2, Observation, Practitioner

The Challenge is to create an app that queries a subset of the related Data of Interest from the Better Health Insurance PIT, then calls $notify-report-requested on the Blaze Global Health PIT to build the Individual MeausureReport in order to display the non-zero measureScore.

The app should take the Patient SSN as input.

The output should contain:

- (4) Encounters
- (1) Observation
- (2) Data Content MeasureReports
- The measureScore from the response of the $notify-report-requested operation

  The expected Results are:

  - Initial Population: count = 2
  - Numerator: count = 1
  - Denominator: count = 2
  - Denominator Exclusion: count = 0
  - measureScore: value 0.5

Please note the Disclaimer regarding the MRP Quality Measure used for the scenario being a Work in Progress implementation, not a finalized, certified Quality Measure. The above results may not be clinically accurate. A real-world scenario would use a production ready, certified Quality Measure.

Your Postman collection contains a Cheat Sheet folder that includes examples of the queries needed for the challenge.

Bonus Points

- Include the patient id from the Better Health Insurance Patient resource in the output.
- Use the meta.lastUpdated element to sort the total resource query and group the data into the collections of related data.
- Include the Organization and Patient resources as “Additional Info”.
- Super Bonus: include the Practitioner resource

Optional Bonus Activities:

- Query the Data Exchange Measure Report in the Better Health Insurance PIT. Notice the differences between the Data Exchange MR and the Individual MR (in addition to the contained resources in the Individual report).

Judging Criteria

IGNITE

Interoperability: APIs and FHIR® Heat Up

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Alignment with Track	Helps to improve Inter-operability	Innovation & Creativity	Use of APIs	User Experience	Technical Difficulty	Presentation or Demo
25%	25%	15%	10%	10%	10%	5%
How aligned was the solution with one of the event Tracks?	Does the team clearly show how their solution could be used to improve interoperabil-ity?	Did the team create some-thing that has not already been created? Is it unique?	Did the team use APIs available to create a solution?	What is the wow factor? Would others be impressed by what was built? How easy is the solution to use?	Is the project technically impressive / complex? Is it remarkable that a team created this solution in the time allowed?	Was the presentation or demo well put together? Did the team seem prepared? How well did they explain the problem and solution? (only judge on content, not video quality)

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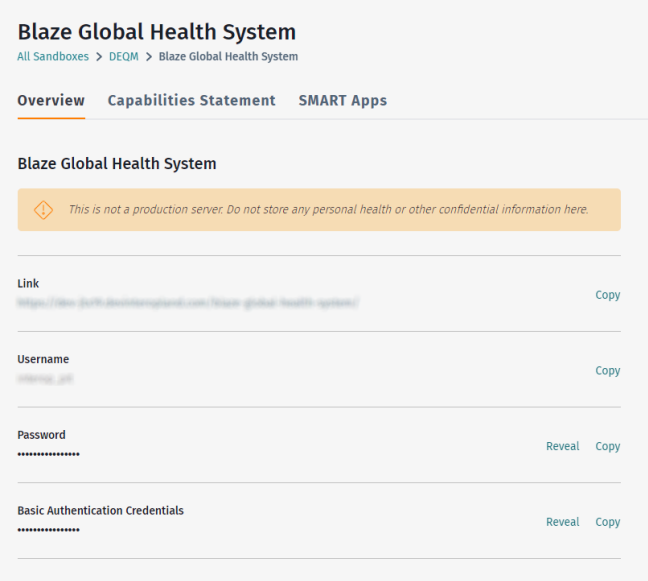
Appendix: Updating Postman Admin Variables

The Basic Auth Username, Basic Auth Password, and Base URL variables are configuration variables for connecting to a specific Ring. Care should be taken in updating their values as incorrect settings will prevent the Postman tool from functioning.

To edit, open the Postman Edit Collection form as described in the Postman Setup section.

Values for the variables can be found in the configuration page of a PIT.

For example:



The Postman variable values can be derived from any of the PITs. Open one and perform the following steps:

- Basic Auth Username: click the Copy link for the PIT Username to copy the value and paste it in the INITIAL VALUE column for the Basic Auth Username Postman variable.
- Basic Auth Password: click the Copy link for the PIT Password to copy the value and paste it in the INITIAL VALUE column for the Basic Auth Password Postman variable.
- Base URL: click the Copy link for the PIT Link to copy the value. Then, using the text editor of your choice, delete everything to the right of the ".com" and copy the remaining text into the INITIAL VALUE column for the Base URL Postman variable.
    - Example value copied from the PIT Link:
        - https://12345.devinteropland.com/blaze-global-health-system/
    - Example value pasted to the Postman Base URL:
        - https://12345.devinteropland.com
- Click the Reset All link to copy the INITIAL VALUEs into the CURRENT VALUEs column and click Update